ORIGINAL RESEARCH

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Importance of education in bronchial asthma treatment — gender differences

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Abstract

Introduction: Despite significant progress in understanding mechanisms and effective treatment there are still therapeutic failures in patients treated for bronchial asthma. Education is vital in the therapeutic process. It improves the control of the disease at the individual level by influencing the adherence and compliance.

Material and methods: The study included 100 patients suffering from bronchial asthma and treated according to GINA 2002 guidelines in Allergy Clinic. Asthma control test (ACT), analysis of patients' medical documentation and a self-constructed questionnaire concerning health promotion and education were used in the study.

Aim of this work was to assess differences in the influence of education on results of bronchial asthma control between sexes.

Results: Average duration of asthma was similar in women and men (13.0 ± 11.16 vs.12.7 ± 9.74 years). Weaker asthma control was found in women (ACT 17.7 vs. 20.4), as well as lower FEV_1 values ($80-50\%$ of predicted value in 60.3% of women vs. 43.25 of men). In women an analysis of correlation concerning patients' knowledge and conducted health education with asthma control revealed a statistically significant positive correlation of knowledge acquired from the allergologist with asthma control, information about proceeding in acute attack, whereas negative correlation with asthma control with knowledge passed on by family doctor was found. Among the male respondents positive correlations of knowledge with asthma control within the scope of knowledge from allergologist and information concerning proceeding in asthmatic attack were found, while negative correlation with information coming from family doctor was revealed.

Conclusions: Health education in patients with asthma should be conducted by a specialist in allergic diseases and well-prepared healthcare professionals.

Key words: asthma control test, effective treatment, quality of life

Introduction

The second half of the 20th century was marked by a disturbing increase in frequency of allergic diseases, including bronchial asthma. Today, allergic diseases affect approximately 20 percent of the global population, and the rate of bronchial asthma amongst adults is 5.4 percent (4.9% in men and 5.8% in women) [1].

Although new mechanisms of treatment have been discovered and the effects of bronchial asthma treatment have significantly improved, in many cases the administered therapy remains ineffective. Many observations have shown that the effects will not improve unless patient education and cooperation become the element of the treatment process. It is very important to educate patients so that they and their family members

are able to eliminate improper practices, which often lead to otherwise preventable misevaluation of danger, delayed rescue and, ultimately, fatal events, including death. An effective and control-improving form of training requires individual cooperation with the patient, outlining the treatment plan and encouraging the patient to a guided self-treatment. Factors determining a successful treatment include partnership, trust and good communication. The principal element of education is to teach the patient to actively participate in the treatment process and to switch from being passive to active. The latest findings suggest that physician-patient partnership, mutual understanding and individual and well-discussed treatment plan significantly improve the course and control of the disease [2].

Evaluation of treatment results based only on biological criteria has proved insufficient, and the area of medical interest has expanded beyond purely traditional medicine, to include also such health measurements as those indicating the activity of patients in different life domains. The interest in quality of life stems from modernised approach to medicine, where the improved level of functioning and self-assessment are equally important or even more important than just the effectiveness of therapy. These studies helped to understand that not only the classic, quantitative therapeutic success indicators, such as survival rate, but also the qualitative parameters, such as symptoms frequency reduction, improved mood, better psychological and physical status are clinically important [3]. A better understanding of the influence of education, socio-demographic and clinical factors on the patient may determine the most optimal method of bronchial asthma treatment and control.

The aim of the study was to evaluate gender differences regarding the effect of education on bronchial asthma control and quality of life.

Material and methods

For conducting the research a permission of Bioethics Committee of the Wroclaw Medical University No. 722/2012 was obtained. The study evaluated a group of 100 patients with bronchial asthma, aged 18 to 80 years, under follow up at the specialist allergy outpatient clinics. The study covered a period from September 2009 to February 2010. One of the inclusion criteria was chronic anti-inflammatory treatment, in accordance with the GINA 2002 guidelines (Global Initiative for Asthma; the main goal was to im-

plement uniform diagnostic, prophylactic and treatment standards combined with the latest asthma research findings). The study measurement tool was the specific Asthma Quality of Life Questionnaire (AQLQ (S)), Asthma Control Test (ACT), and own questionnaire for the assessment of the level of patients' knowledge and education regarding their disease. The several-point scale of the AQLQ questionnaire enables the evaluation of physical activity of asthma patients, their ability to avoid factors inducing shortness of breath, night symptoms, fear of missing medications, effects of symptoms on everyday life activities. The questionnaire is composed of 32 questions on a 7-point scale, where 1 means maximum symptoms exacerbation or severely impaired function, and 7 means that a function has not been impaired at all. The total result of life quality assessment is expressed as the average from all questions [4].

Asthma Control Test is validated and widely used in every day clinical practice. The test includes five questions measured in a 5-point scale. They assess asthma symptoms and medication utilization in the last four weeks [5].

The questionnaire regarding the level of knowledge and education was composed of 6 questions, and allowed to evaluate the extent to which the patient understands his/her disease and knows the principles of self-treatment and self-care and who and how often give them medical information about asthma, ability to cope with the disease, source of knowledge, information received during out-patient visit and circumstances to obtain information about asthma. Survey also included socio-demographic data such as gender, age, marital status, financial situation, professional, education, place of residence, factors affecting asthma and analysis of medical records, allowing to collect clinical data of the patient. When using quality of life questionnaires it is possible to evaluate the subjective dimension of health status. Quality of life is a measurable subjective criterion and an element of medical technology. Studies of the quality of life, which have now been performed on the basis of standardised questionnaires for approximately 10 years, have become a recognised tool in medical research. This stems from the need to obtain the fullest, quantifiable result of the patient's health status. The statistical analysis was supported by Microsoft Excel in combination with the Statistica 9 PL package, and the following methods of statistical analysis were used: to test significance — Student's t-test for unrelated variables and Chi-squared test for independent features; to test the

effect of independent variables on quality of life factors — multiple regression; to determine the correlation between independent variables and asthma control — Pearson's linear correlation test. The main inclusion criteria were signed informed consent form and a clinical condition allowing unassisted completion of the questionnaire. Each subject was assured of anonymity and informed of the study purpose.

Results

The study enrolled 63% of women (average age 47.1 ± 14.9 years, the average age of men was 41.4 ± 18.2 years. The main sociodemographic statistics characterising the subjects are presented in Table 1.

Clinical analysis

The average duration of asthma was similar in women and men (13.0 ± 11.2 vs. 12.7 ± 9.7 years, but the rate of acute events was higher in women, respectively: everyday, including at night 11.5% of women vs. 2.7% of men, and 3–4 times a week 12.7% of women vs. 8.1% of men. The interviewed women scored lower in asthma control (17.7 ± 5.2 vs. 20.4 ± 3.6) and had lower FEV_1 values (80–50% of predicted value in 60.3% of women vs. 43.25% of men). Results are presented in Table 2.

The analysis of the level of knowledge of asthma revealed that women were more informed than men. 61.9% women vs. 54.05% men think to know enough about their asthma disease. Sufficient information allowing the patient to cope with the disease was found in 72% (73% women vs. 70% men) of respondents, with the main source of information from an allergist (94%), the media (39%), and brochures and magazines (70%). 85,71% women and 70.27% men are aware that more they know about the disease the better they control asthma symptoms. Unfortunately only less than half of patients receive information during each visit. Almost 16% women and 21% men state that they have never been educated on asthma. Results are presented in Table 3.

Correlation analysis regarding patients' knowledge and health-related education with asthma control in women has shown a statistically significant positive correlation of knowledge obtained from an allergologist with asthma control ($r_{xy} < 0.40$), information regarding treatment in case of acute asthma attack ($r_{xy} < 0.36$), and a negative correlation with asthma control was observed with the knowledge obtained from

Table 1. General and demographic statistics

	All subjects	Women	Men	p
No. of patients	100%	63%	37%	
Age (years)				0.09
Average	45.0	47.1	41.4	
SD	16.34	14.88	18.21	
Education				0.32
Primary	12.%	11.11%	13.51%	
Occupational	19.%	20.63%	16.22%	
Secondary	33.%	26.98%	43.24%	
Higher	36.%	41.27%	27.03%	
Place of residence				0.79
Country	16.%	17.46%	13.51%	
City/town	84.0%	82.54%	86.49%	
BMI [kg/m²]				0,12
Average	26.5	26.4	26.6	
SD	4.43	4.75	3.9	
Smoking				0.3
No	57.%	61.9%	48.65%	
Quit	30.%	28.57%	32.43%	
Yes	13.%	9.52%	18.92%	
Years of smoking				0.46
Average	14.2	13.3	15.5	
SD	9.7	8.53	11.13	
No. of smoked cigarettes [pcs]				0.03
Average	14.0	11.9	16.6	
SD	7.08	6.63	6.91	

SD — standard deviation

a family practitioner ($r_{xy} < -0.36$) and the media ($r_{xy} < -0.26$). Amongst the interviewed men a positive correlation of knowledge and asthma control were found with regards to: knowledge obtained from an allergologist ($r_{xy} < 0.40$), education in the principles of asthma and its mechanisms ($r_{xy} < 0.38$), and information on treatment in case of asthma attack ($r_{xy} < 0.31$), and a negative correlation with the knowledge obtained from a family practitioner ($r_{xy} < -0.42$). Results are presented in Table 4.

The analysis of quality of life based on asthma severity and its control showed that the severity of asthma was positively correlated with asthma control test, especially in the interviewed women ($r_{xy} < 0.42$). The milder asthma symptoms were, the better scores were achieved in the Asth-

Table 2. Clinical characteristics of subjects

	All subjects	Women	Men	p
Years of disease				0.92
Average	12.9	13.0	12.7	
SD	10.61	11.16	9.74	
Asthma Control Test (ACT)				0.003
average	18.7	17.7	20.4	
SD	4.88	5.24	3.65	
No. of acute events				
Everyday, incl. at night	23.%	30.06%	10.18%	
3, 4 times a week	27.%	30.16%	21.62%	0.02
Once a week	20.%	17.46%	24.32%	
Once a month or less	30.%	22.22%	43.25%	
Main symptoms				
Shortness of breath during a day	66.%	68.25%	62.16%	
Morning cough	29.%	26.98%	32.43%	0.82
Waking-up at night due to shortness of breath	5.%	4.76%	5.41%	
Visits in allergy outpatient clinic				0.43
2 times a month	10.%	12.7%	5.41%	
Once a month	29.%	30.16%	27.03%	
6 times a year	28.%	30.16%	24.32%	
3 times a year	21.%	15.87%	29.73%	
Less	12.%	11.11%	13.51%	
Hospitalisation				0.84
1−2 times	39.%	41.27%	35.14%	
3−5 times	6.%	6.35%	5.41%	
6−10 times	4.%	3.17%	5.41%	
More	4.%	3.17%	5.41%	
FEV_1/FVC				0.025
average	79.47	77.4	83	
SD	12.17	11.71	12.28	
FEV_1 — acc. to category				
> 80	46%	38.1%	56.76%	0.07
50–80	54%	60.32%	43.24%	0.1

ma Control Test. Positive correlation in women was also found between asthma severity and the quality of life evaluated by AQLQ in the following domains: symptoms ($r_{xy} < 0.42$), limitation of activity ($r_{xy} < 0.33$), and emotional functioning ($r_{xy} < 0.33$). The milder asthma symptoms, the better scores were achieved in particular domains. No correlation was observed between the severity of asthma or asthma control test and the quality of life in the interviewed men. Results are presented in Table 5.

Discussion

The patient with asthma should receive written information on how the doses of the prescribed medications can be changed and to what extent. Self-control should never discharge the patient from following the basic rules, in particular from attending the scheduled consultations with an allergist, from regularly taking the medications in doses prescribed during a visit or in the self-control plan.

Table 3. Patients knowledge assessment and sources of its obtaining

	All	Female	Male	p
Assessment of knowledge on the nature of asthma				0,41
High level of knowledge	59%	61.9%	54.05%	
Average level of knowledge	25%	20.63%	32.43%	
Lack of knowledge	16%	17.46%	13.51%	
Ability to cope with the disease				0.27
Sufficient	72%	73.02%	70.27%	
Average	18%	20.63%	13.51%	
Lack of skills	9%	6.35%	15.21%	
Source of knowledge				
Allergologist	94%	93.65%	94.59%	0.85
Family doctor	26%	28.57%	21.62%	0.44
Nurse	11%	12.7%	8.11%	0.48
Media	39%	36.51%	43.24%	0.5
Magazine/brochure	70%	44.44%	45.95%	0.03
Other sources	16%	17.46%	13.51%	0.46
The impact of knowledge for life of the patient with asthma				0.13
Increases control symptoms	80%	85.71%	70.27%	
Has no effect on the treatment	5%	4.76%	5.41%	
I have no opinion	15%	9.52%	24.32%	
Circumstances to obtain information about asthma				0.65
During a visit to the clinic	48%	49.21%	45.95%	
Occasionally (depending on the visit)	32%	31.75%	32.43%	
Nobody told me about the management of asthma	18%	15.87%	21.62%	
Receives information only when I ask	2%	3.17%	0	
Information received during out-patient visit about:				
Principles of the treatment	57%	53.97%	62.16%	0.34
Living with chronic disease	51%	49.21%	54.05%	0.64
Using inhaled drug.	67%	73.02%	56.76%	0.1
Lifestyle modification	43%	42.86%	43.24%	0.97

The more the patient knows about the disease, the better he/she can cooperate with the therapeutic team and is able to help himself/ /herself to control the symptoms more effectively [6]. One of the most important elements of self-treatment is to be able to quickly react in case of severe exacerbation.

In our study the largest cohort were women (63%). According to the authors of "PTA and PTF Expert Panel Report" 2006, the prognosis for asthma is worse when the first onset of symptoms occurs during or after puberty, which happens more often in women [7].

We have found that quite a large population of asthma patients lives in urban areas. Other important factor influencing the course of the disease in our patients is smoking. The average duration of smoking was 14.2 years and the average number of smoked cigarettes was 14. Jassem [8] suggests that smoking may have a pro-allergic and pro-inflammatory effect, as it damages the bronchial epithelium and impairs local protection mechanisms. The negative impact of smoking includes also its effect on molecular mechanisms inhibiting the beneficial effect of inhaled glucocorticosteroids.

Table 4. Correlations between health promotion, education and asthma control in men and women

	Asthma control		
	All subjects	Women	Men
Knowledge of how to cope with asthma	0.04	0.08	−0.12
Knowledge from allergologist	0.12	0.40*	0.40*
Knowledge from family practitioner	−0.37*	−0.36*	−0.42*
Knowledge from a nurse	−0.22	−0.23	−0.15
Knowledge from the media	−0.21*	−0.26*	−0.19
Knowledge from brochures and magazines	−0.17	−0.11	−0.17
Education in asthma principles	0.12	0.02	0.38*
Education in treatment in case of asthma attack	0.11*	0.36*	0.31*
Education in the usage of inhalation medications	0.00	0.07	0.02
Education in lifestyle	−0.09	−0.05	−0.21

* indicates statistically significant values

Table 5. Correlations between asthma severity, quality of life and asthma control in men and women

	Asthma severity		
	All subjects	Women	Men
Asthma Control Test	0.35*	0.42*	0.23
Symptoms (AQLQ)	0.32*	0.42*	0.16
Limitation of Activity (AQLQ)	0.21*	0.33*	0.00
Emotional functioning (AQLQ)	0.25*	0.33*	0.11
Environmental stimuli (AQLQ)	0.14	0.22	0.02

* indicates statistically significant values; AQLQ — Asthma Quality of Life Questionnaire

Patients often do suffer from very low self-esteem and lack of social usefulness. Poor financial situation as the result of unemployment caused by the patient's inability to work also negatively impact mental condition [9].

Our study has found that age had a negative effect on asthma control, probably due to certain specific therapeutic problems, such as greater risk of adverse drug effects, especially in case of comorbidity. The medications, especially inhaled medications, are often misused by elder patients, while longer duration time of the disease makes the number of hospitalisation and medical intervention greater. Patients with cognitive deficits or manually disable who fail to cooperate with the physician is an especially serious problem in the context of proper use of inhaled medications that are the first-choice of asthma treatment [7]. Another important factor which may affect asthma control in these patients is poor socioeconomic status, and the fact that because of high medication prices they can afford only some of the prescribed medications.

Quality of life assessment amongst the respondents revealed higher quality of life scores for men than women. This may be due to comorbidity, higher rate of symptoms exacerbation, and the resulting poorer asthma control in women. The analysis of the level of knowledge of asthma revealed that women were more informed than men. Sufficient information allowing the patient to cope with the disease was observed in 72% of respondents, with the main source of information being an allergist (94%), the media (39%), brochures (38%), and magazines (32%). The correlation analysis of knowledge and health education with asthma control has shown a statistically significant positive correlation of knowledge obtained from an allergist with asthma control, information regarding treatment in case of acute asthma attack both in men and women, and a negative correlation with asthma control was found with knowledge obtained from a family practitioner and the media amongst both men and women. This may be due to the fact that the information provided by family practitioners is incomplete. Early diagnosis and asthma prophylaxis are the main goals of treatment but they may be achieved only if family practitioners are included in the treatment process. Rising asthma rates should motivate family practitioners to become more alert during regular patient visits, and more especially so because patients rarely suspect their symptoms of being asthma-related. Steciwko et al. [10] are advocates of continuous skills improvement of family practitioners regarding allergic diseases, asthma and the methods of treatment in accordance with the latest research findings. Guidelines regarding the diagnosis and treatment of allergic diseases and asthma, published in regularly updated reports, such as GINA or ARIA (Allergic Rhinitis and its Impact on Asthma) should be communicated to family doctors in a form of simple algorithms [10]. The effectiveness of treatment of a chronic disease depends on the level of physician-patient cooperation, and good cooperation means that patients are provided with accurate and clear information about their disease. Asthma control, on the other hand, can be practiced on the basis of knowledge obtained from an allergist and training provided by health care professionals. Training on the correct

use of inhaled medication or a nebuliser is especially important. Many studies have evaluated the effects of different forms of education. Gawlewicz et al. [11] have noticed that the methods which patients choose are often not the most effective ones. In addition to that, methods aiming to inform only have the potential to raise patients' awareness but do not necessarily cause lung function or the need of medical assistance to improve. Improvement in asthma treatment can be achieved by using interactive educational methods in conjunction with individual advice. For example, three educational meetings held by a specially trained nurse may be enough to reduce the number of patients readmitted to the A&E department due to loss of asthma control. Participation in special courses for asthma patients has also reduced the number of hospitalisations and visits to the emergency department, at least within 12 months following the end of the course [11]. Adamczyk [12], Lopes et al. [13] showed that patients who were less educated had lower scores regarding their well-being and health status, which may explain why the quality of life amongst women in our study was lower. Uchmanowicz et al. [14] found that education affected the patient's self-assessment in the domain of symptoms and environmental stimuli as measured by the AQLQ questionnaire. We have seen in our study a significant positive correlation of asthma control with all quality of life domains evaluated by the AQLQ questionnaire in women. Higher score meant better asthma control, and better asthma control meant higher quality of life. Our results are in line with the study by Chełmińska et al.[15], which evaluated the correlation between asthma control and better subjective well-being and quality of life [15]. The correlation analysis indicates that the severity of asthma is especially significant in the case of women and their quality of life [16−18]. Results obtained by Weiner [19] suggest that women who suffer from asthma report more symptoms, use more medications, and experience worse quality of life. Weiner et al. claim that gender differences may be due to the fact that women perceive their symptoms as heavier, suggesting that women and men experience dyspnoea attacks differently [19]. Therefore, it seems reasonable that gender differences should be taken into consideration while studying the correlation of knowledge with quality of life and asthma control test amongst asthma patients. Considering that women and men experience asthma symptoms in a different manner, we may try to implement treatment and education more suited to the needs of women and their subjective perception of the disease, thus improving their quality of life.

Conclusions

Health education with asthma should be conducted by a specialist allergologist and well-prepared healthcare professionals. Being able to properly react in case of asthma attack is the most important aspect of that education for both women and men.

The knowledge of the principles of asthma and its management positively impacts quality of life and the level of asthma control in both sexes.

Conflict of interest

The authors declare no conflict of interest.

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